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# New Breeds - Are They for You?

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Sheep breeds differ greatly in levels of performance for economically important traits. Because the differences among breeds are genetic in nature, these differences can be exploited rapidly and cheaply to increase profits for sheep producers. While over 30 breeds exist in the U.S., there are foreign breeds that may fit into our sheep industry. A past example is the use of Finnsheep to improve reproductive performance in commercial flocks. There is a growing opportunity to import the most promising breeds throughout the world. If subsequent experimental evaluation documents the usefulness of imported breeds, these breeds may be substituted for less desirable breeds to improve the efficiency of sheep production. The benefits of the imported breeds can be realized through their use as purebreds, as part of crossbreeding systems or as a contributor to the genetic foundation of new composite breeds. The incorporation of Finnsheep germ plasm with Dorset, Rambouillet, and Targhee to form the Polypay breed is an example of the latter situation.

Three "exotic" breeds have recently been imported into North America and flocks have been established at the Meat Animal Research Center (MARC). These breeds are being multiplied to increase numbers and two breeds are currently being evaluated relative to standard U.S. breeds. The main objective of the evaluations will be to characterize the performance levels of these breeds and to assess their potential roles in the sheep industry. The purpose of this paper is to review briefly the history, performance, importation, and potential industry uses of the three imported breeds.

## Booroola Merino

The Booroola strain of Merino sheep was developed by the Seears Brothers near Cooma in New South Wales, Australia. The brothers selected for multiple births in Merinos starting in the 1940's. Ewes that produced multiple lambs were transferred into a separate flock. These ewes were bred to rams purchased from other flocks without knowledge of birth type. Although selection for multiple births was thus practiced only among ewes, the results were highly successful in this particular flock. In 1959, the Seears Brothers provided the agricultural department of Australia with a ram born as a quintuplet. Additional sheep were later purchased from the Seears flock. This second flock of Booroola Merinos was also selected for multiple births and reached a litter size of 2.4 lambs born per ewe lambing by 1978. The Merino breed typically has a lambing rate of about 1.2 lambs.

Scientific interest in the Booroola Merino increased rapidly due to the unusual success in selecting for multiple births. Drs. Piper and Bindon of Australia suggested the possibility that the high

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reproductive rate of Booroolas may be due to a single gene that increases ovulation rate. This single gene theory is now commonly accepted as the mechanism for increased reproduction in Booroolas. This unique characteristic distinguishes Booroolas from other breeds, including breeds that are highly prolific such as the Finnsheep. Individual sheep can have 0, 1, or 2 copies of the Booroola gene. Merino sheep without the gene have an ovulation rate of about 1.4 ova. However, Merinos with one copy of the gene ovulate about 2.9 ova and Merinos with two copies of the gene have an ovulation rate of about 4.4 ova. The effect of the gene is, therefore, an increase of about 1.5 ova per gene in the Merino breed. However, these additional ova are not fully realized as lambs at birth because embryo mortality also increases. Thus, the increase in lambing rate is less than the increase in ovulation rate. The lambing rate of Booroola Merinos that have two copies of the Booroola gene is currently accepted as about 2.7 lambs.

The Booroola Merino is one of the most prolific breeds in the world. With the exception of the Booroola gene and its associated effect on lambing rate, the performance of the Booroola Merino does not differ from the typical Merino. It has excellent fleece characteristics and the Merino breed is known for hardiness, longevity, and flocking instinct. It grows slowly and has a low mature weight. It also is late to reach puberty, with poor conception rate of ewes bred to lamb at 12 months of age.

In the fall of 1983, 21 Coopworth ewes carrying Booroola Merino embryos and 5 Booroola Merino rams were imported from New Zealand to MARC. Since then, Booroola Merino ewes have only been bred to Booroola Merino rams. The flock currently consists of about 70 ewes and 55 rams. Rams surplus to research needs have been offered for sale the past 2 years. Research was initiated in 1983 to compare the performance of Booroola and Finnsheep crossbred ewes and to evaluate the effect of the Booroola gene.

Due to the characteristics of the Booroola Merino, it is expected to be used in the production of first-cross commercial ewes. Such ewes would have one copy of the gene and an increased ovulation rate relative to the other breed involved in the cross. The lambing rate would also depend on the other breed used to form the cross. It is likely that the Booroola gene itself will be transferred into other breeds to increase ovulation rate but avoid the undesirable characteristics of the Merino breed. The transfer could be achieved by the standard genetic practice of continual backcrossing and progeny testing of rams. This is a long-term project and requires considerable commitment of resources. The new approaches of molecular biology also offer the possibility to transfer the Booroola gene more rapidly by directly measuring its presence in both rams and ewes and thus avoid the need to progeny test rams.

Texel

The Texel breed evolved on the Isle of Texel, off the coast of The Netherlands. It belonged to a group of white-faced, short-tailed marsh sheep that thrived along the coast from Denmark to Northern France. To compete for the British lamb market in the early 19th century, increased meatiness was required. The Isle of Texel obtained a breed inspector in 1802 who organized shows for the purpose of maintaining breed purity and influencing development of meat characteristics. Crosses of the Texel breed with Leicesters in 1846 and with Lincolns in 1880 were also made to improve meatiness. Upgrading to these breeds was not successful and no more crossbreeding occurred thereafter. Further genetic improvement was a consequence of selection among the sheep on the Isle of Texel. The judging of rams at central shows was a dominant force in this selection process. Today, the Texel is widely recognized for its superior carcass leanness relative to European breeds of sheep.

The success of the selection program resulted in widespread exportation of Texels into other countries since 1930. France, Belgium, and Luxemburg were among the first countries to import Texels. The Federal Republic of Germany has imported over 14,000 Texels and the breed now represents about 8% of the total sheep population. Other countries that have imported Texels directly from the Netherlands include Italy, Brazil, Peru, Spain, Denmark, Switzerland, and the United Kingdom. Further dispersion of the breed occurred through these importing countries.

The Texel breed has been evaluated as a terminal sire breed in numerous European studies. Eight such studies have compared the performance of progeny by 21 sire breeds, with the Suffolk, Oxford, and Ile de France breeds being used most frequently. Results of these experiments were in general agreement with regard to growth and carcass composition. Texel-sired lambs grew less rapidly than Oxford- and Suffolk-sired lambs but more rapidly than lambs by Ile de France rams. Texel-sired lambs excelled in percentage carcass lean (+4%), percentage carcass fat (-4%), lean to bone ratio, and loin eye area. These results provided the basis for importation of the Texel as a breed that might improve carcass leanness in the U.S.

The reproductive performance of Texel ewes has not been compared to any breeds presently available in the U.S. However, the performance of purebred Texel ewes for various reproductive traits has been reported by Dutch scientists. Analysis of 60 years of data provided a mean lambing rate of 1.31 and 1.84 for ewe lambs and older ewes, respectively. A 5-month breeding season is common for mature ewes. Texels are relatively young at puberty and appear to have good mothering ability. The breed is medium sized and thickly muscled. It has a dense fleece of medium quality. Concern has been expressed about ewe longevity and lamb mortality associated with lambing difficulty. These important traits are being monitored at MARC.

During 1984, an opportunity developed to import the Texel breed into the U.S. At that time, the New Zealand Ministry of Agriculture and Fisheries was importing several European breeds, including the Texel, into New Zealand from Finland and Denmark. Arrangements were made to import into the U.S. a sample of Texel ewes and rams that had previously produced embryos for importation into New Zealand. Because of the health status of livestock in Finland and Denmark, a quarantine site was constructed at MARC during late 1984. Five Texel rams from Denmark arrived at MARC in January of 1985. This was followed by the arrival of 20 pregnant ewes and four rams from Finland in April of 1985. In August of 1988, frozen semen from four Texel rams in quarantine in New Zealand was imported to broaden the sampling of the Texel breed. Texel ewes at MARC were inseminated that fall. The flock currently consists of about 135 ewes and 100 rams. Texels can not be offered for sale until the quarantine period is completed. Texel-sired lambs are presently being compared to progeny of Suffolk rams to evaluate genetic effects on lamb survival, growth rate, carcass composition, and meat traits.

The Texel has useful levels of performance for many important traits. Therefore, it seems that the breed might eventually be used in several different roles depending partly on the financial incentive for producers to sell lean carcasses. The breed likely will be used as a general purpose pure breed. It may be used as a terminal sire of market lambs, depending on how well it competes with the Suffolk. Texel rams may be bred to well-adapted ewe breeds to produce first-cross commercial ewes. Finally, the merits of the Texel breed probably will be exploited as a contributor to new general purpose, maternal, and/or paternal composite breeds. As an example, the Texel might be combined with breeds like the Finnsheep and Romanov to offset the limitations of these prolific breeds for carcass leanness and to set reproductive rates at desirable levels for commercial flocks that take advantage of specialized sire and dam lines. Or, the

Texel might be combined with the Columbia breed to create a white-faced terminal sire breed.

Romanov

It seems that little is known about the history of the Romanov breed. It originated in the Soviet Union in the 18th century. The Romanov breed may have derived from a short-tailed Nordic breed. It evolved in an area northeast of Moscow in close proximity to where the Finnsheep is thought to have originated. The two prolific breeds have many similar characteristics and may trace back to a common breed, the European Mouflon.

Romanovs are black at birth except for a white spot on the forehead and turn gray as they mature. Males have a mane of long black hair. They produce a fleece of low weight and poor quality wool. Romanov are small-sized sheep and fine-boned. The strengths of the breed are the early sexual maturity, very high prolificacy, and superior mothering characteristics. Rams may be fertile by 3 to 4 months of age, while it is reported that Romanov ewes have lambed at 9 months of age. The breed also exhibits a long season of sexual activity. The prolificacy of the Romanov in North America may be greater than Finnsheep; lambing rates average about 4.0 for adult ewes and about 2.5 for ewe lambs.

During 1980, Agriculture Canada imported 14 Romanov ewes and 5 Romanov rams from France. The sheep were quarantined for five years at the Lennoxville Research Station in Quebec. The flock expanded quite rapidly and research was initiated in Canada to evaluate the performance of Romanovs. Through cooperative efforts of Agriculture Canada and the U.S. Department of Agriculture, 16 pregnant Romanov ewes and 4 Romanov rams were transferred to MARC in the fall of 1986. The flock currently has about 160 ewes and 115 rams. Rams surplus to research needs were offered for sale in 1988.

Due to its outstanding reproductive ability, the Romanov will likely be used in the production of commercial ewes. First-cross ewes with one-half Romanov germ plasm would be very prolific. It may be that crossbred Romanov rams will be used to produce one-quarter Romanov commercial ewes, giving a reproductive rate that is more appropriate for less intense production situations. Romanov germ plasm is also well suited as a contributor to new composite breeds. It may be used in a general purpose composite breed or more likely in a specialized composite developed as a maternal breed.